19-1502; Rev 2; 3/02

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

General Description

The MAX4617/MAX4618/MAX4619 are high-speed, low-voltage, CMOS analog ICs configured as an 8-channel multiplexer (MAX4617), two 4-channel multiplexers (MAX4618), and three single-pole/double-throw (SPDT) switches (MAX4619).

These CMOS devices can operate continuously with a +2V to +5.5V single supply. Each switch can handle Rail-to-Rail® analog signals. The off-leakage current is only 1nA at T_A = +25°C and 10nA at T_A = +85°C.

All digital inputs have 0.8V to 2.4V logic thresholds, ensuring TTL/CMOS-logic compatibility when using a single +5V supply.

Applications

Battery-Operated Equipment

Audio/Video Signal Routing

Low-Voltage Data-Acquisition Systems

Communications Circuits

Features

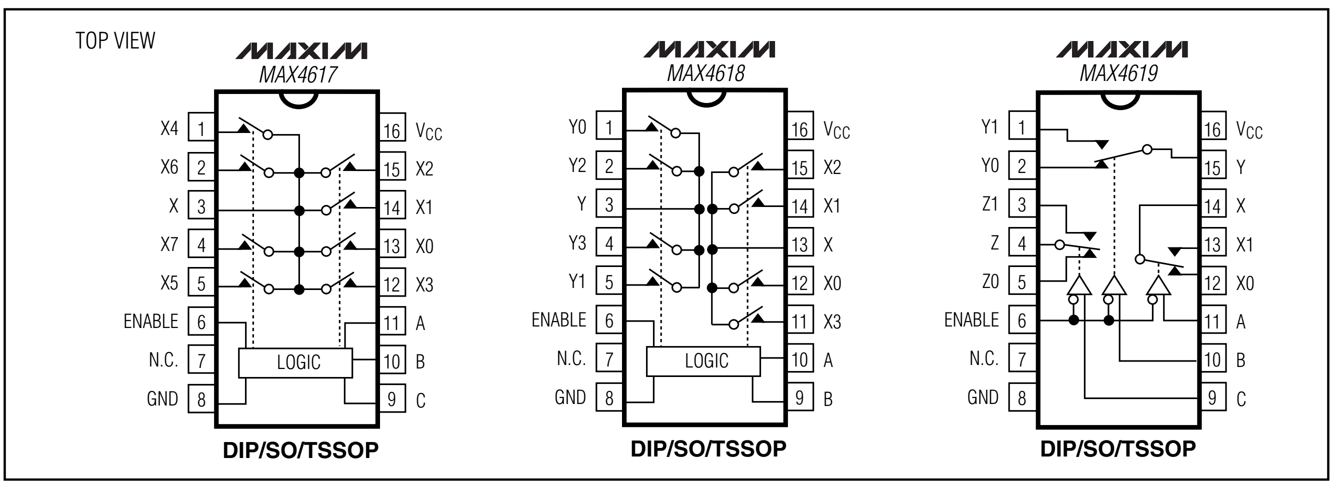
- **Fast Switching Times**
  - **15ns t_{ON}**
  - **10ns t_{OFF}**
- **Pin Compatible with Industry-Standard 74HC4051/74HC4052/74HC4053 and MAX4581/MAX4582/MAX4583**
- **Guaranteed On-Resistance**
  - **10Ω max (+5V Supply)**
  - **20Ω max (+3V Supply)**
- **Guaranteed 1Ω On-Resistance Match Between Channels (single +5V supply)**
- **Guaranteed Low Off-Leakage Current: 1nA at +25°C**
- **Guaranteed Low On-Leakage Current: 1nA at +25°C**
- **+2V to +5.5V Single-Supply Operation**
- **TTL/CMOS-Logic Compatible**
- **Low Crosstalk: <-96dB**
- **High Off-Isolation: <-93dB**
- **Low Distortion: <0.017% (600Ω)**

Ordering Information

PART	TEMP. RANGE	PIN-PACKAGE
MAX4617CUE	0°C to +70°C	16 TSSOP
MAX4617CSE	0°C to +70°C	16 Narrow SO
MAX4617CPE	0°C to +70°C	16 Plastic DIP

Ordering Information continued at end of data sheet.

Pin Configurations/Functional Diagrams



ABSOLUTE MAXIMUM RATINGS

Voltages Referenced to GND
V_{CC}, A, B, C, or Enable ....-0.3V to +6V
Voltage into Any Analog Terminal
(Note 1) ....-0.3V to (V_{CC} + 0.3V)
Continuous Current into Any Terminal ....±75mA
Peak Current, X_, Y_, Z_
(pulsed at 1ms, 10% duty cycle) ....±200mA
Continuous Power Dissipation (T_A = +70°C)
TSSOP (derate 6.7mW/°C above +70°C) 533mW
16-Pin QFN (derate 18.5mW/°C above +70°C) 1481mW
Narrow SO (derate 8.70mW/°C above +70°C) 696mW
Plastic DIP (derate 10.53mW/°C above +70°C) 842mW
Operating Temperature Ranges
MAX461_C_ _ ....0°C to +70°C
MAX461_E_ _ ....-40°C to +85°C
Storage Temperature Range ....-65°C to +150°C
Lead Temperature (soldering, 10sec) ....+300°C

Note 1: Voltages exceeding V_{CC} or GND on any analog signal terminal are clamped by internal diodes. Limit forward-diode current to maximum current rating.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS—Single +5V Supply

(V_{CC} = +4.5V to +5.5V, $V_{_H}$ = 2.4V, $V_{_L}$ = 0.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog-Signal Range	V_X, V_Y, V_Z		C, E	0		V_{CC}	V
Switch On-Resistance	R_{ON}	V_{CC} = 4.5V; I_X, I_Y, I_Z = 10mA; V_X, V_Y, V_Z = 3V	T_A = +25°C		8	10	Ω
			C, E			13	
Switch On-Resistance Match Between Channels (Notes 3,7)	ΔR_{ON}	V_{CC} = 5V; I_X, I_Y, I_Z = 10mA; V_X, V_Y, V_Z = 3V	T_A = +25°C		0.2	1	Ω
			C, E			1.2	
Switch On-Resistance Flatness (Note 4)	$R_{FLAT(ON)}$	V_{CC} = 5V; I_X, I_Y, I_Z = 10mA; V_X, V_Y, V_Z = 1V, 2V, 3V	C, E			1	Ω
X_, Y_, Z_ Off-Leakage Current (Note 5)	$I_{X_(OFF)}$, $I_{Y_(OFF)}$, $I_{Z_(OFF)}$	V_{CC} = 5.5V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 4.5V, 1V; V_X, V_Y, V_Z = 1V, 4.5V	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
X, Y, Z Off-Leakage Current (Note 5)	$I_{X(OFF)}$, $I_{Y(OFF)}$, $I_{Z(OFF)}$	V_{CC} = 5.5V; V_{EE} = -5.5V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 4.5V, 1V; V_X, V_Y, V_Z = 1V, 4.5V	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
X, Y, Z On-Leakage Current (Note 5)	$I_{X(ON)}$, $I_{Y(ON)}$, $I_{Z(ON)}$	V_{CC} = 5.5V; V_X, V_Y, V_Z = 1V, 4.5V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V, 4.5V or floating	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
DIGITAL I/O							
Input Voltage High	V_{AH}, V_{BH}, V_{CH}, $V_{ENABLEH}$		C, E	2.4			V
Input Voltage Low	V_{AL}, V_{BL}, V_{CL}, $V_{ENABLEL}$		C, E			0.8	V

ELECTRICAL CHARACTERISTICS—Single +5V Supply (continued)

(V_{CC} = +4.5V to +5.5V, $V_{_H}$ = 2.4V, $V_{_L}$ = 0.8V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS			MIN	TYP	MAX	UNITS
Input Current High	I_{AH}, I_{BH}, I_{CH}, I_{ENABLE}	V_A, V_B, V_C = V_{ENABLE} = V_{CC}		C, E	-1	0.0003	1	µA
Input Current Low	I_{AL}, I_{BL}, I_{CL}, I_{ENABLE}	V_A, V_B, V_C = V_{ENABLE} = 0		C, E	-1	0.0003	1	µA
SWITCH DYNAMIC CHARACTERISTICS								
Enable Turn-On Time (Note 6)	t_{ON}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V; R_L = 300Ω; C_L = 35pF; Figure 3		T_A = +25°C		7	15	ns
				C, E			18	
Enable Turn-Off Time (Note 6)	t_{OFF}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V; R_L = 300Ω; C_L = 35pF; Figure 3		T_A = +25°C		4.5	10	ns
				C, E			13	
Address Transition Time (Note 6)	t_{TRANS}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V; R_L = 300Ω; C_L = 35pF; Figure 2		T_A = +25°C		7	15	ns
				C, E			18	
Break-Before-Make Time (Note 6)	t_{BBM}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V; R_L = 300Ω; C_L = 35pF; Figure 4		T_A = +25°C	0.2	1.5		ns
Charge Injection	Q	C = 1nF, R_S = 0, V_S = 0, Figure 5		T_A = +25°C		3		pC
Input Off-Capacitance	$C_{X_(OFF)}$, $C_{Y_(OFF)}$, $C_{Z_(OFF)}$	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 0; f = 1MHz; Figure 7		T_A = +25°C		5		pF
Output Off-Capacitance	$C_{X(OFF)}$, $C_{Y(OFF)}$, $C_{Z(OFF)}$	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 0; f = 1MHz; Figure 7	MAX4617	T_A = +25°C		27		pF
			MAX4618			15		
			MAX4619			8.5		
Output On-Capacitance	$C_{X(ON)}$, $C_{Y(ON)}$, $C_{Z(ON)}$	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 0; f = 1MHz; Figure 7	MAX4617	T_A = +25°C		32		pF
			MAX4618			21		
			MAX4619			15.5		
Off-Isolation	V_{ISO}	R_L = 50Ω, f = 100kHz, Figure 6		T_A = +25°C		-93		dB
Channel-to-Channel Crosstalk	V_{CT}	R_L = 50Ω, f = 100kHz, Figure 6		T_A = +25°C		-96		dB
Total Harmonic Distortion	THD	R_L = 600Ω, 1Vp-p, f = 20Hz to 20kHz		T_A = +25°C		0.017		%
POWER SUPPLY								
Power-Supply Range	V_{CC}			C, E	+2		+5.5	V
Power-Supply Current	I_{CC}	V_{CC} = 5.5V; V_A, V_B, V_C, V_{ENABLE} = V_{CC} or 0		T_A = +25°C	-1		1	µA
				C, E	-10		10	

ELECTRICAL CHARACTERISTICS—Single +3.3V Supply

(V_{CC} = +3V to +3.6V, $V_{_H}$ = 2.0V, $V_{_L}$ = 0.5V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Analog-Signal Range	$V_{X_}$, $V_{Y_}$, $V_{Z_}$, V_X, V_Y, V_Z		C, E	0		V_{CC}	V
Switch On-Resistance	R_{ON}	V_{CC} = 3V; I_X, I_Y, I_Z = 10mA; V_X, V_Y, V_Z = 1.5V	T_A = +25°C		8	20	Ω
			C, E			25	
X_, Y_, Z_ Off-Leakage Current (Note 5)	$I_{X_(OFF)}$, $I_{Y_(OFF)}$, $I_{Z_(OFF)}$	V_{CC} = 3.6V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V, 3V; V_X, V_Y, V_Z = 3V, 1V	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
X, Y, Z Off-Leakage Current (Note 6)	$I_{X(OFF)}$, $I_{Y(OFF)}$, $I_{Z(OFF)}$	V_{CC} = 3.6V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V, 3V; V_X, V_Y, V_Z = 3V, 1V	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
X, Y, Z On-Leakage Current (Note 6)	$I_{X(ON)}$, $I_{Y(ON)}$, $I_{Z(ON)}$	V_{CC} = 3.6V; V_X, V_Y, V_Z = 3V, 1V; $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V, 1V, or floating	T_A = +25°C	-1	0.002	1	nA
			C, E	-10		10	
DIGITAL I/O							
Input Voltage High	V_{AH}, V_{BH}, V_{CH}, $V_{ENABLEH}$		C, E	2.0			V
Input Voltage Low	V_{AL}, V_{BL}, V_{CL}, $V_{ENABLEL}$		C, E			0.5	V
Input Current High	I_{AH}, I_{BH}, I_{CH}, $I_{ENABLEH}$	V_A, V_B, V_C = V_{ENABLE} = V_{CC}	C, E	-1	0.0003	1	µA
Input Current Low	I_{AL}, I_{BL}, I_{CL}, $I_{ENABLEL}$	V_A, V_B, V_C = V_{ENABLE} = 0	C, E	-1	0.0003	1	µA
SWITCH DYNAMIC CHARACTERISTICS							
Enable Turn-On Time (Note 6)	t_{ON}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1.5V; R_L = 300Ω; C_L = 35pF; Figure 3	T_A = +25°C		9	20	ns
			C, E			25	
Enable Turn-Off Time (Note 6)	t_{OFF}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1.5V; R_L = 300Ω; C_L = 35pF; Figure 3	T_A = +25°C		6	15	ns
			C, E			20	
Address Transition Time (Note 6)	t_{TRANS}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1.5V/0; R_L = 300Ω; C_L = 35pF; Figure 2	T_A = +25°C		9	20	ns
			C, E			25	
Break-Before-Make Time (Note 6)	t_{BBM}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1.5V; R_L = 300Ω; C_L = 35pF	T_A = +25°C	0.2	1.5		ns
Charge Injection (Note 6)	Q	C = 1nF, R_S = 0, V_S = 0, Figure 5	T_A = +25°C		3		pC
POWER SUPPLY							
Power-Supply Current	I_{CC}	V_{CC} = 3.6V, V_A, V_B, V_C, V_{ENABLE} = V_{CC} or 0	T_A = +25°C			1	µA
			C, E			10	

ELECTRICAL CHARACTERISTICS—Single +2.5V Supply

(V_{CC} = +2.5V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 2)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
ANALOG SWITCH							
Switch On-Resistance	R_{ON}	V_{CC} = 2.5V; I_X, I_Y, I_Z = 10mA; V_X, V_Y, V_Z = 1.2V	T_A = +25°C		30	60	Ω
			C, E			100	
SWITCH DYNAMIC CHARACTERISTICS							
Enable Turn-On Time (Note 6)	t_{ON}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V; R_L = 300Ω; C_L = 35pF; Figure 3	T_A = +25°C		12		ns
Enable Turn-Off Time (Note 6)	t_{OFF}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V; R_L = 300Ω; C_L = 35pF; Figure 3	T_A = +25°C		10		ns
Address Transition Time (Note 6)	t_{TRANS}	$V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 1V; R_L = 300Ω; C_L = 35pF; Figure 3	T_A = +25°C		12		ns

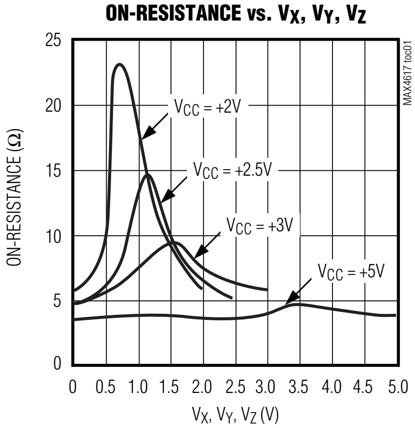
Note 2: The algebraic convention is used in this data sheet; the most negative value is shown in the minimum column.
Note 3: $\Delta R_{ON} = R_{ON(MAX)} - R_{ON(MIN)}$.
Note 4: Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal ranges; i.e., $V_{X_}$, $V_{Y_}$, $V_{Z_}$ = 3V to 0 and 0 to -3V.
Note 5: Leakage parameters are 100% tested at maximum-rated hot operating temperature, and guaranteed by correlation at T_A = +25°C.
Note 6: Guaranteed by design, not production tested.
Note 7: ΔR_{ON} matching specifications for QFN-packaged parts are guaranteed by design.

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

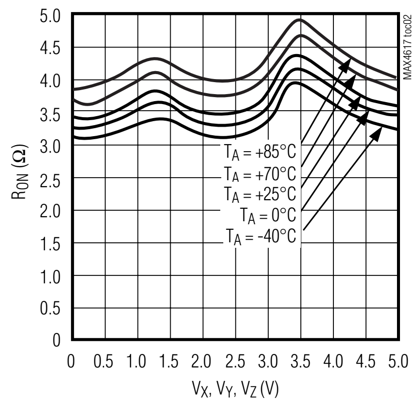
Typical Operating Characteristics

(V_{CC} = +5V, GND = 0, T_A = +25°C, unless otherwise noted.)

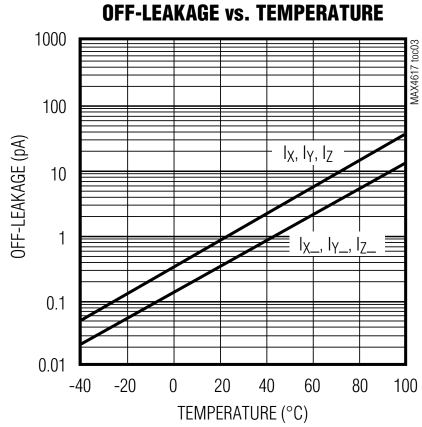
ON-RESISTANCE vs. V_X, V_Y, V_Z



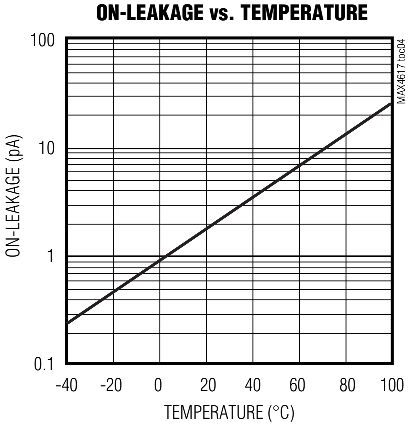
ON-RESISTANCE vs. V_X, V_Y, V_Z AND TEMPERATURE



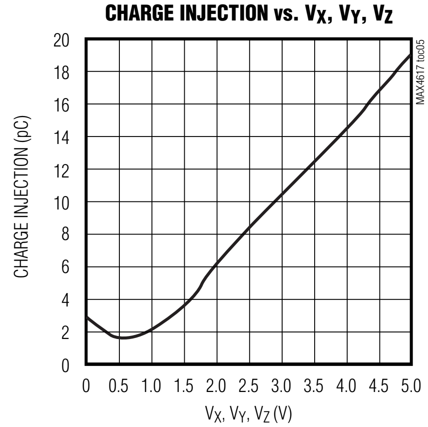
OFF-LEAKAGE vs. TEMPERATURE



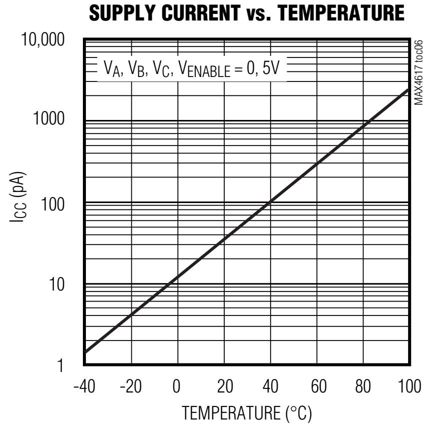
ON-LEAKAGE vs. TEMPERATURE



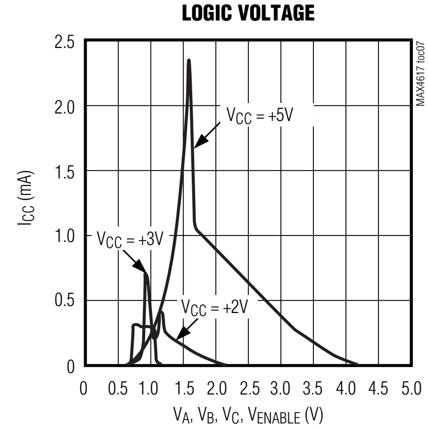
CHARGE INJECTION vs. V_X, V_Y, V_Z



SUPPLY CURRENT vs. TEMPERATURE

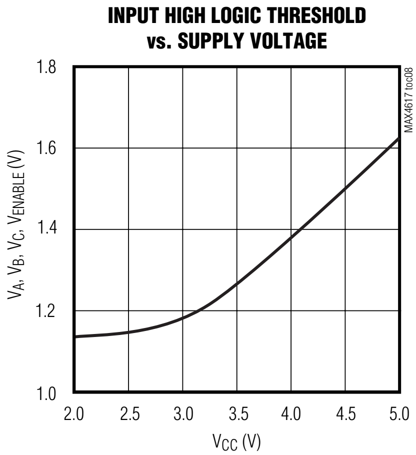


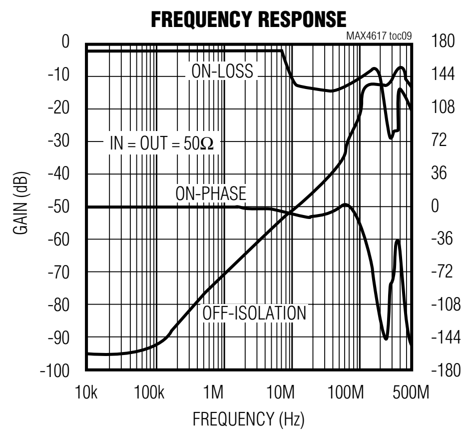
SUPPLY CURRENT vs. LOGIC VOLTAGE

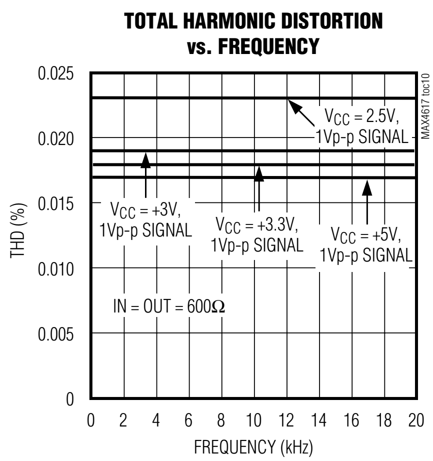


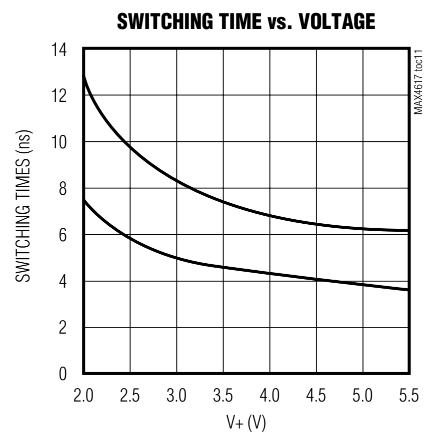
Typical Operating Characteristics (continued)

(V_{CC} = +5V, GND = 0, T_A = +25°C, unless otherwise noted.)









High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

Pin Description

PIN			NAME	FUNCTION
MAX4617	MAX4618	MAX4619		
13, 14, 15, 12, 1, 5, 2, 4	—	—	X0–X7	Analog Switch Inputs 0–7
3	—	—	X	Analog Switch Output
—	12, 14, 15, 11	—	X0, X1, X2, X3	Analog Switch "X" Inputs 0–3
—	13	14	X	Analog Switch "X" Output
—	—	13	X1	Analog Switch "X" Normally Open Input
—	—	12	X0	Analog Switch "X" Normally Closed Input
—	—	1	Y1	Analog Switch "Y" Normally Open Input
—	—	2	Y0	Analog Switch "Y" Normally Closed Input
6	6	6	ENABLE	Digital Enable Input. Normally connect to GND. Can be driven to logic high to set all switches off.
7	7	7	N.C.	No Connection. Not Internally connected.
8	8	8	GND	Ground
11	10	11	A	Digital Address "A" Input
10	9	10	B	Digital Address "B" Input
9	—	9	C	Digital Address "C" Input
—	1, 5, 2, 4	—	Y0, Y1, Y2, Y3	Analog Switch "Y" Inputs 0–3
—	3	15	Y	Analog Switch "Y" Output
—	—	5	Z0	Analog Switch "Z" Normally Closed Input
—	—	3	Z1	Analog Switch "Z" Normally Open Input
—	—	4	Z	Analog Switch "Z" Output
16	16	16	V_{CC}	Positive Analog and Digital Supply Voltage Input

Note: *Input and output pins are identical and interchangeable. Any may be considered an input or output; signals pass equally well in both directions.*

Applications Information

Power-Supply Considerations

Overview

The MAX4617/MAX4618/MAX4619 construction is typical of most CMOS analog switches. They have two supply pins: V_{CC} and GND. V_{CC} and GND are used to drive the internal CMOS switches and set the limits of the analog voltage on any switch. Reverse ESD-protection diodes are internally connected between each analog-signal pin and both V_{CC} and GND. If any analog signal exceeds V_{CC} or GND, one of these diodes conducts. During normal operation, these and other reverse-biased ESD diodes leak, forming the only current drawn from V_{CC} or GND.

Virtually all the analog leakage current comes from the ESD diodes. Although the ESD diodes on a given signal pin are identical and therefore fairly well balanced, they are reverse biased differently. Each is biased by either V_{CC} or GND and the analog signal. This means their leakages will vary as the signal varies. The *difference* in the two diode leakages to the V_{CC} and GND pins constitutes the analog-signal-path leakage current. All analog leakage current flows between each pin and one of the supply terminals, not to the other switch terminal. This is why both sides of a given switch can show leakage currents of either the same or opposite polarity.

V_{CC} and GND power the internal logic and set the input logic limits. Logic inputs have ESD-protection diodes to ground.

The logic-level thresholds are TTL/CMOS compatible when V_{CC} is +5V. As V_{CC} rises, the threshold increases; as V_{CC} falls, the threshold decreases. For example, when V_{CC} = +3V the guaranteed minimum logic-high threshold decreases to 2.0V

Power Supply

These devices operate from a single supply between +2.5V and +5.5V. All of the bipolar precautions must be observed. At room temperature, they actually “work” with a single supply near or below +2V, although as supply voltage decreases, switch on-resistance becomes very high.

Overvoltage Protection

Proper power-supply sequencing is recommended for all CMOS devices. Do not exceed the absolute maximum ratings because stresses beyond the listed ratings can cause permanent damage to the devices. Always sequence V_{CC} on first, followed by the logic inputs and analog signals. If power-supply sequencing is not possible, add two small signal diodes (D1, D2) in series with the supply pins for overvoltage protection (Figure 1).

Adding diodes reduces the analog-signal range to one diode drop below V_{CC} and one diode drop above GND, but does not affect the devices' low switch resistance and low leakage characteristics. Device operation is unchanged, and the difference between V_{CC} and GND should not exceed 6V. These protection diodes are not recommended if signal levels must extend to ground.

High-Frequency Performance

In 50Ω systems, signal response is reasonably flat up to 50MHz (see *Typical Operating Characteristics*). Above 20MHz, the on-response has several minor peaks that are highly layout dependent. The problem is not turning the switch on, but turning it off. The off-state switch acts like a capacitor and passes higher frequencies with less attenuation. At 10MHz, off-isolation is about -50dB in 50Ω systems, becoming worse (approximately 20dB per decade) as frequency increases. Higher circuit impedances also degrade off-isolation. Adjacent channel attenuation is about 3dB above that of a bare IC socket and is entirely due to capacitive coupling.

Pin Nomenclature

The MAX4617/MAX4618/MAX4619 are pin compatible with the industry-standard 74HC4051/74HC4052/74HC4053 and the MAX4581/MAX4582/MAX4583. In single-supply applications, they function identically and have identical logic diagrams, although these parts differ electrically.

The pin designations and logic diagrams in this data sheet conform to the original 1972 specifications published by RCA for the CD4051/CD4052/CD4053. These designations differ from the standard Maxim switch and mux designations found on other Maxim data sheets (including the MAX4051/MAX4052/MAX4053) and may cause confusion. Designers who feel more comfortable with Maxim's standard designations are advised that the pin designations and logic diagrams on the MAX4051/MAX4052/MAX4053 data sheet may be freely applied to the MAX4617/MAX4618/MAX4619.

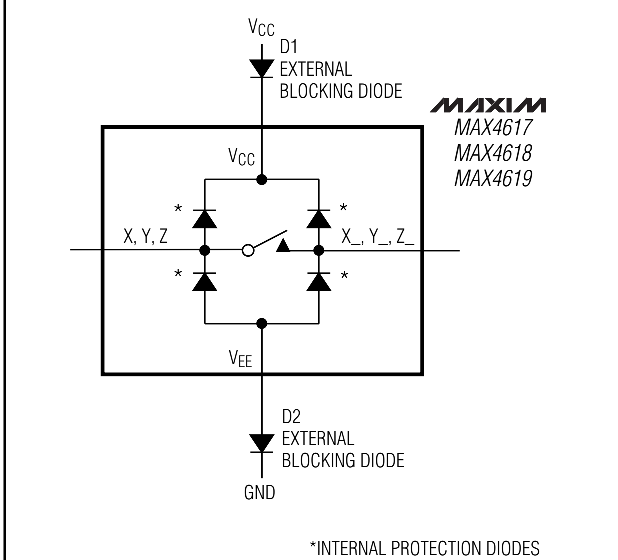


Figure 1. Overvoltage Protection Using External Blocking Diodes

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

Table 1. Truth Table/Switch Programming

ENABLE INPUT	SELECT INPUTS			ON SWITCHES		
	C*	B	A	MAX4617	MAX4618	MAX4619
H	X	X	X	All switches open	All switches open	All switches open
L	L	L	L	X–X0	X–X0, Y–Y0	X–X0, Y–Y0, Z–Z0
L	L	L	H	X–X1	X–X1, Y–Y1	X–X1, Y–Y0, Z–Z0
L	L	H	L	X–X2	X–X2, Y–Y2	X–X0, Y–Y1, Z–Z0
L	L	H	H	X–X3	X–X3, Y–Y3	X–X1, Y–Y1, Z–Z0
L	H	L	L	X–X4	X–X0, Y–Y0	X–X0, Y–Y0, Z–Z1
L	H	L	H	X–X5	X–X1, Y–Y1	X–X1, Y–Y0, Z–Z1
L	H	H	L	X–X6	X–X2, Y–Y2	X–X0, Y–Y1, Z–Z1
L	H	H	H	X–X7	X–X3, Y–Y3	X–X1, Y–Y1, Z–Z1

X = Don't care

**C not present on MAX4618.*

Note: *Input and output pins are identical and interchangeable. Either may be considered an input or output; signals pass equally well in either direction.*

Test Circuits/Timing Diagrams

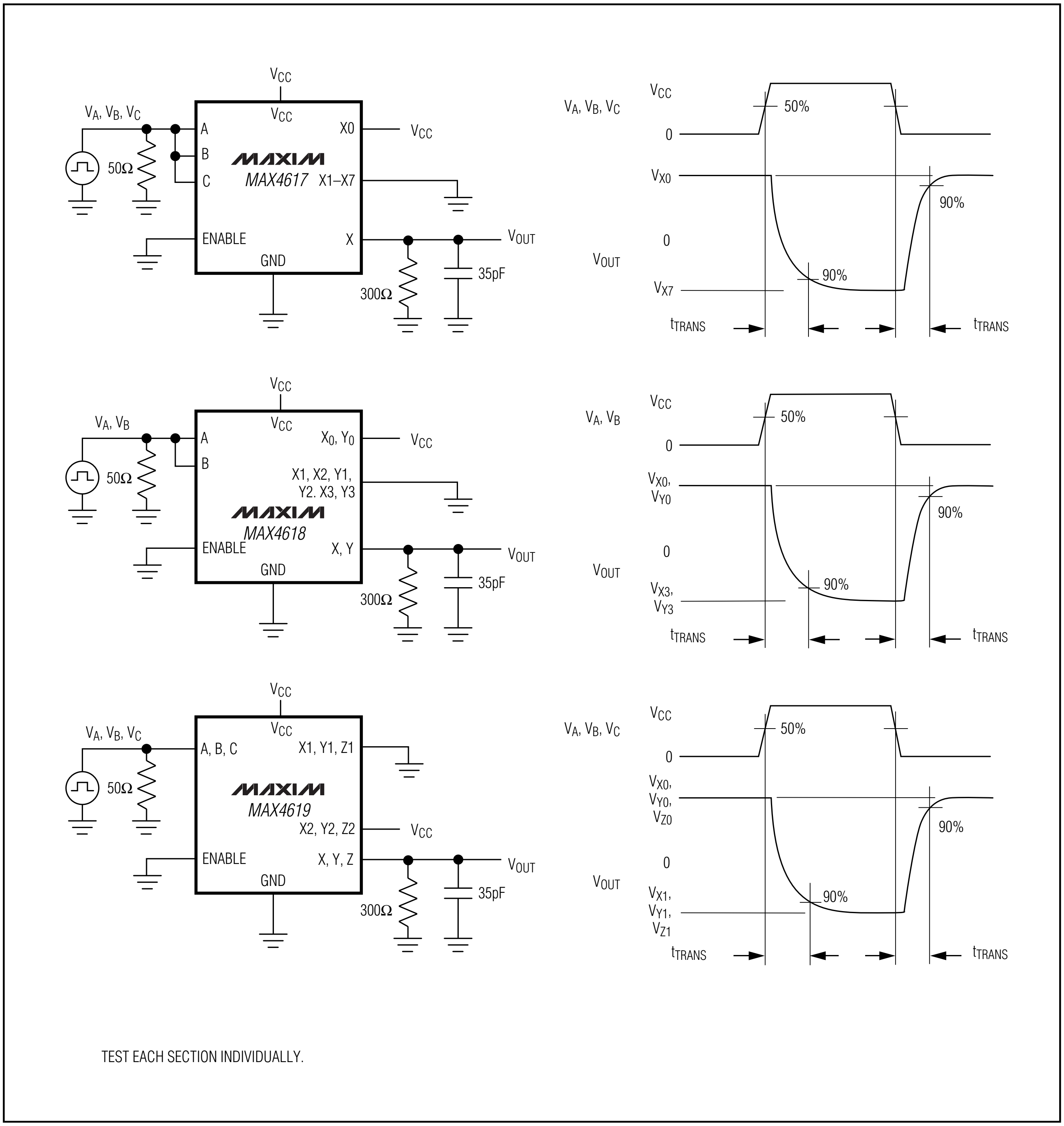


Figure 2. Address Transition Times

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

Test Circuits/Timing Diagrams (continued)

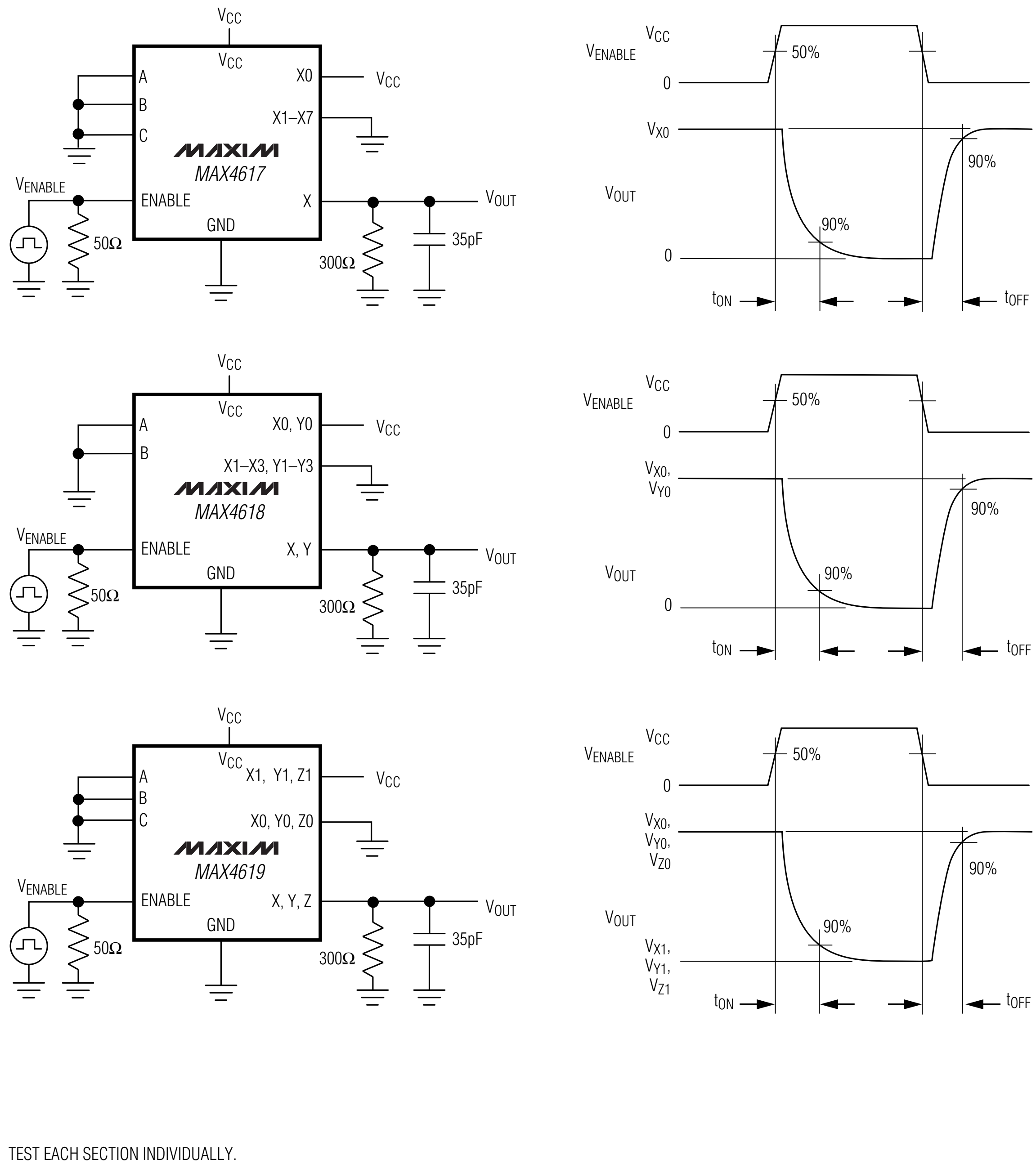


Figure 3. Enable Switching Times

Test Circuits/Timing Diagrams (continued)

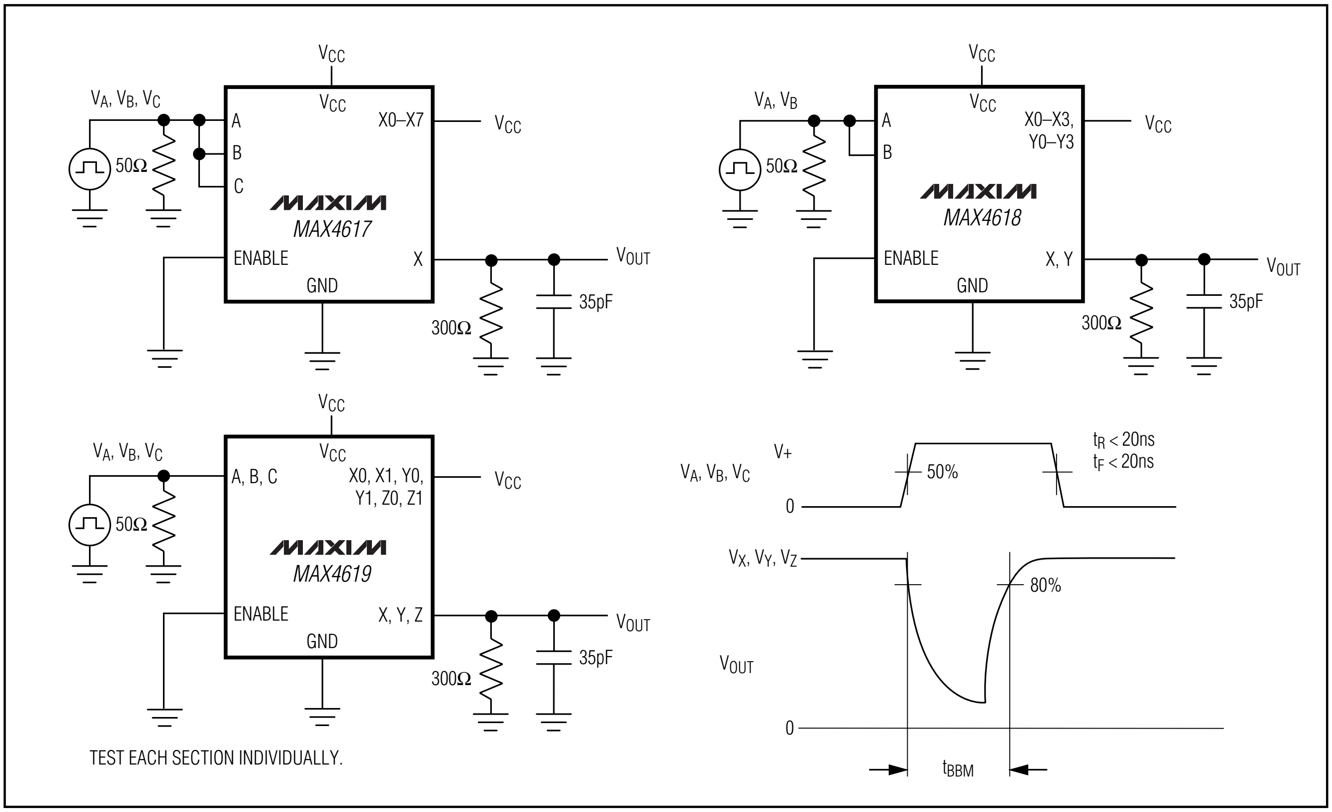


Figure 4. Break-Before-Make Interval

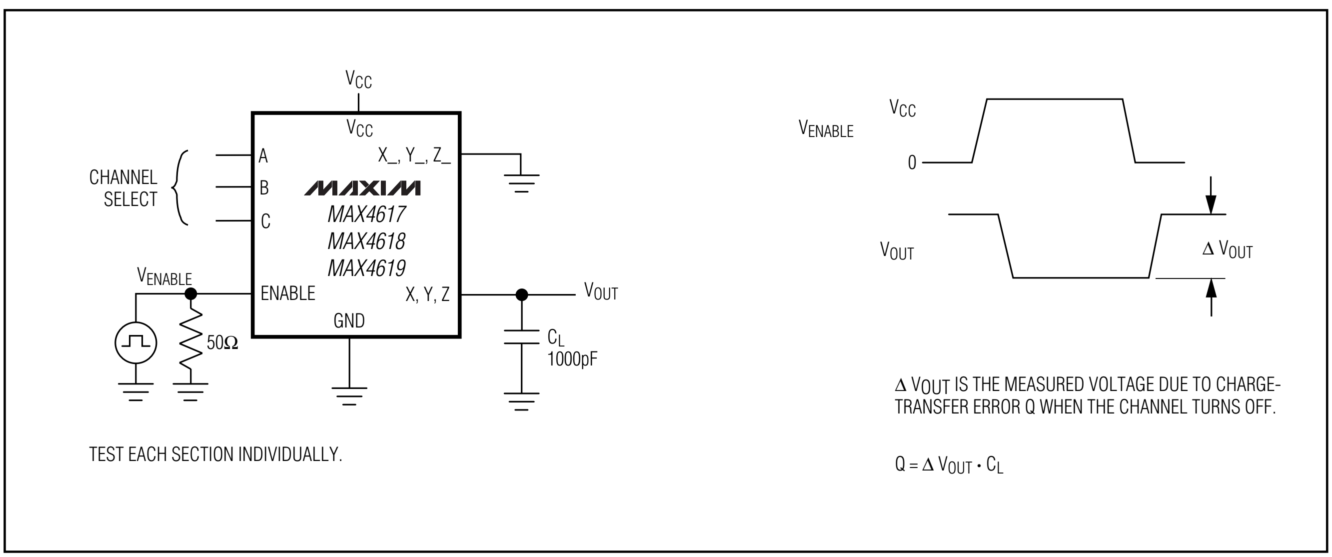
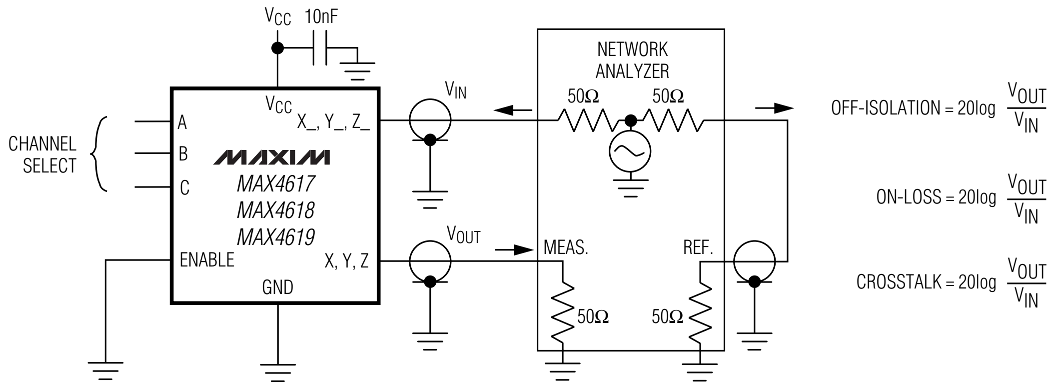


Figure 5. Charge Injection

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

Test Circuits/Timing Diagrams (continued)



NOTES: MEASUREMENTS ARE STANDARDIZED AGAINST SHORT AT SOCKET TERMINALS.
OFF ISOLATION IS MEASURED BETWEEN COM AND "OFF" NO TERMINAL ON EACH SWITCH.
ON LOSS IS MEASURED BETWEEN COM AND "ON" NO TERMINAL ON EACH SWITCH.
CROSSTALK (MAX4618/MAX4619) IS MEASURED FROM ONE CHANNEL (A, B, C) TO ALL OTHER CHANNELS.
SIGNAL DIRECTION THROUGH SWITCH IS REVERSED; WORST VALUES ARE RECORDED.

Figure 6. Off-Isolation, On-Loss, and Crosstalk

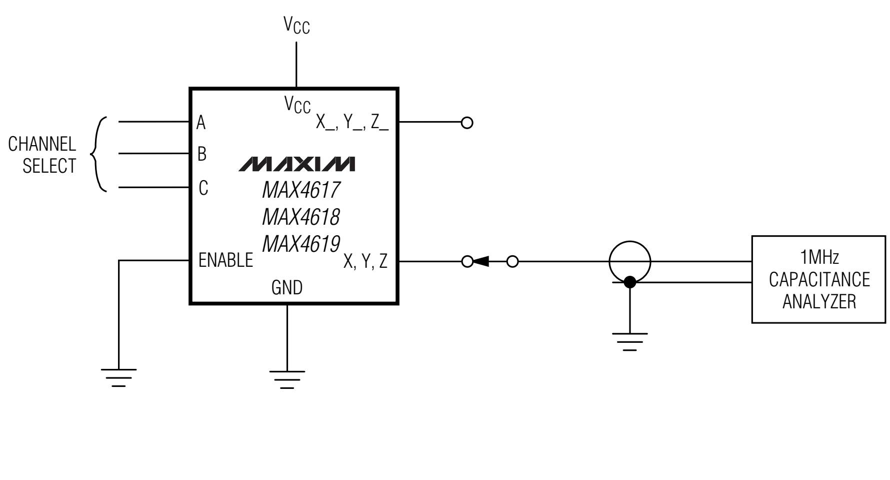


Figure 7. Capacitance

PART	TEMP RANGE	PIN-PACKAGE
MAX4617EGD	-40°C to +85°C	16 QFN
MAX4617EUE	-40°C to +85°C	16 TSSOP
MAX4617ESE	-40°C to +85°C	16 Narrow SO
MAX4617EPE	-40°C to +85°C	16 Plastic DIP
MAX4618CUE	0°C to +70°C	16 TSSOP
MAX4618CSE	0°C to +70°C	16 Narrow SO
MAX4618CPE	0°C to +70°C	16 Plastic DIP
MAX4618EGD	-40°C to +85°C	16 QFN
MAX4618EUE	-40°C to +85°C	16 TSSOP
MAX4618ESE	-40°C to +85°C	16 Narrow SO
MAX4618EPE	-40°C to +85°C	16 Plastic DIP
MAX4619CUE	0°C to +70°C	16 TSSOP
MAX4619CSE	0°C to +70°C	16 Narrow SO
MAX4619CPE	0°C to +70°C	16 Plastic DIP
MAX4619EGD	-40°C to +85°C	16 QFN
MAX4619EUE	-40°C to +85°C	16 TSSOP
MAX4619ESE	-40°C to +85°C	16 Narrow SO
MAX4619EPE	-40°C to +85°C	16 Plastic DIP

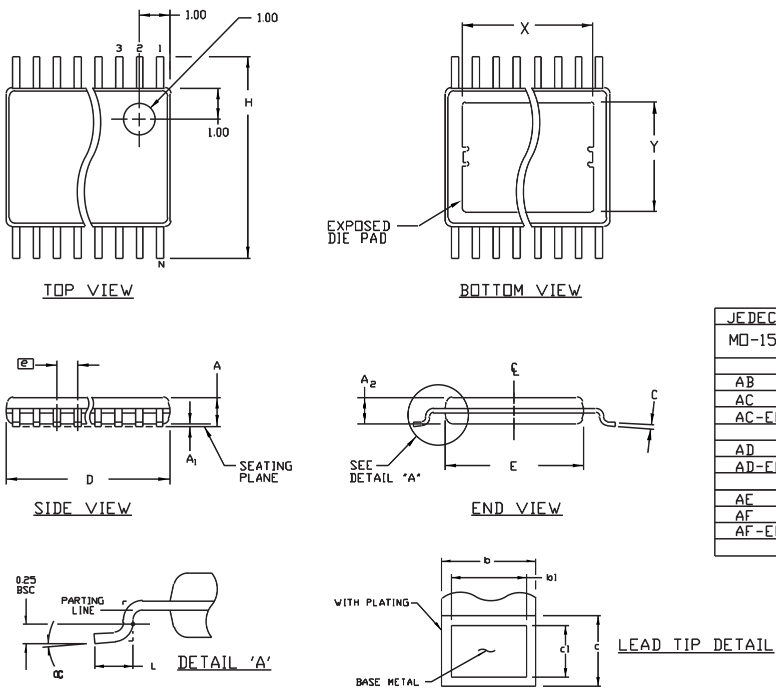
Chip Information

TRANSISTOR COUNT: 244

High-Speed, Low-Voltage, CMOS Analog Multiplexers/Switches

Package Information

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information,



TSSOP.EPS

SYMBOL	COMMON DIMENSIONS			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	——	1.10		.043
A_1	0.05	0.15	.002	.006
A_2	0.85	0.95	.033	.037
b	0.19	0.30	.007	.012
b1	0.19	0.25	.007	.010
c	0.090	0.20	.0035	.008
c1	0.090	0.135	.0035	.0053
D	SEE VARIATIONS		SEE VARIATIONS	
E	4.30	4.50	.169	.177
e	0.65 BSC		.026 BSC	
H	6.25	6.50	.246	.256
L	0.50	0.70	.020	.028
N	SEE VARIATIONS		SEE VARIATIONS	
Y	2.85	3.15	.112	.124
α	0°	8°	0°	8°

JEDEC			VARIATIONS			
MO-153	N		MILLIMETERS		INCHES	
			MIN.	MAX.	MIN.	MAX.
AB	14	D	4.90	5.10	.193	.201
AC	16	D	4.90	5.10	.193	.201
AC-EP	16	D	4.90	5.10	.193	.201
		X	2.85	3.15	.112	.124
AD	20	D	6.40	6.60	.252	.260
AD-EP	20	D	6.40	6.60	.252	.260
		X	4.00	4.34	.157	.171
AE	24	D	7.70	7.90	.303	.311
AF	28	D	9.60	9.80	.378	.386
AF-EP		D	9.60	9.80	.378	.386
		X	5.35	5.65	.211	.222

NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE FLASH.
2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .15 mm PER SIDE.
3. CONTROLLING DIMENSION: MILLIMETER.
4. MEETS JEDEC OUTLINE MO-153 VARIATIONS AB, AC, AD, AE, AF.
5. DIMENSIONS X AND Y APPLY TO EXPOSED PAD (EP) VERSIONS ONLY.
6. EXPOSED PAD FLUSH WITH BOTTOM OF PACKAGE WITHIN .002".

MAXIM
PROPRIETARY INFORMATION
TITLE:
PACKAGE OUTLINE, TSSOP, 4.40mm BODY, 0.65mm PITCH

APPROVAL	DOCUMENT CONTROL NO.	REV	
	21-0066	C	1/1